

Appendix F

Watershed Prioritization

This document describes the data, processes, and methods used by the CRT in developing the Watershed Prioritization (Section 6.3). It also discusses the limitations of the data and methods, and thus, the limitations of the results.

Watershed delineations are based on the CALWATER Hydrologic Subareas (HSAs), as described in Chapter 6 (Recovery Units and Watersheds). Four maps were generated to implement the prioritization. This section describes each of these maps and the data used in their development.

MAP 1: CONSISTENT PRESENCE

What: Shows the percentage of streams surveyed, in each HSA, that have Consistent Presence of coho salmon over two or three years.

Data: Coho salmon presence/absence tables found in the watershed summaries provided to the CRT by the Department regions.

Analysis: Since presence/absence data for only two years (2001 and 2002) were available for many of the watersheds, the analysis was based on the two years that were found consistently across HSAs. A handful of HSAs were surveyed in 2000 and those survey results were included.

Consistent Presence was defined as outlined below. Then, by counting the number of streams surveyed per HSA, a percentage of consistent presence (Consistent Presence in two of eight streams surveyed in that watershed = 25% Consistent Presence) was calculated.

Results were grouped into six rankings:

- 0 = No surveys in this watershed
- 1 = Streams surveyed, but no coho salmon found
- 2 = Coho salmon found, but no Consistent Presence
- 3 = 0-9% Consistent Presence
- 4 = 10-49% Consistent Presence
- 5 = 50-100% Consistent Presence

Shown below are the criteria used to determine if a stream had Consistent Presence:

FOR STREAMS WITH TWO YEARS OF SURVEY RESULTS

CONSISTENT PRESENCE	YEAR	YEAR
N	no data	no data
N	A	no data
N	A	A
N, but coho salmon found	P	A
Y	P	no data
Y	P	P

FOR STREAMS WITH THREE YEARS OF SURVEY RESULTS			
CONSISTENT PRESENCE	YEAR	YEAR	YEAR
N	no data	no data	no data
N	A	(A)	(A)
N, but coho salmon found	P	A	no data
N, but coho salmon found	P	A	A
Y	P	P	A
Y	P	no data	no data
Y	P	P	no data
Y	P	P	P

Limitations: This map was produced using presence/absence data, not abundance data. Therefore, it doesn't represent the total numbers of fish in any given HSA, only that they were there. Also, since a consistent field data capture technique was used only in recent years, there are only two or three years of data to evaluate, which limits the scope of the results. Finally, this map only shows where streams have been surveyed and whether coho salmon were found. Many streams were not surveyed. This creates a bias based on how many streams were surveyed in a given HSA. Some HSAs had only one or two streams surveyed and could receive a 50% or 100% Consistent Presence with only one or two streams having coho salmon presence, while other HSAs had 20+ streams surveyed and could have many more streams with coho salmon presence and still not reach the 50% Consistent Presence mark. The streams that were surveyed, however, were based on historic data that showed where the coho salmon were most likely to be found, and it was assumed that there are very few additional streams that could have been surveyed where coho salmon would have been found.

Consistent Presence for the SONCC Coho ESU is shown on Figure 6-23 and for the CCC Coho ESU, on Figure 6-24.

MAP 2: COHO SALMON POPULATION AND RISK

What: Shows the combination of coho salmon population factors and risk factors by HSA.

Data: This map represents the compilation of several data sources. See below for details on the six combined analyses used.

Analysis: The rankings for the three coho salmon population factors were first added together, and then the three risk factor rankings were added together and divided by three. This added the risk factors in as equivalent to each individual population factor. Finally, both totals were added and then grouped into quintiles separately for each ESU.

Limitations: This map was produced by combining the rankings of six separate analyses (three for coho salmon population factors, and three for risk factors). See below for specific limitations on each of these.

Compiled Analysis: The following six items represent individual analyses that all were considered in the coho salmon population and risk map. All of these analyses involved assigning a score to each HSA and then grouping the scores into ranks (usually 1 to 5). Since there are many factors that differ between the two ESUs, these range breaks were often created separately for each ESU (3, 4, and 5).

1. CONSISTENT PRESENCE – SEE PREVIOUS MAP

2. ISOLATION INDEX

Data: CALWATER 2.2 HSAs and consistent presence data created from presence/absence data from watershed summaries.

Analysis: This analysis assessed the geographic isolation of every HSA that had any level of Consistent Presence (ranks 3, 4, and 5). To accomplish this, the following was done for each HSA that fell into this category:

1. Selected all HSAs within the same HU that were at least partially within a 5-mile radius of the boundary of the selected HSA.
2. Summed the area of all of the selected border HSAs.
3. Summed the area of all of the selected border HSAs that also had some level of Consistent Presence.
4. Calculated the percentage of Consistent Presence area out of the total area. The lower the percentage of nearby Consistent Presence HSAs, the more isolated the ranking.

The rankings were as follows:

- 1 = 100-70% (not very isolated)
- 3 = 70-45% (somewhat isolated)
- 5 = 45-0% (very isolated)

Limitations: This analysis is based on the proximity of HSAs to other HSAs within the larger HU. It does not look at direct hydrologic connectivity, but at clusters of HSAs that eventually drain to the same point.

3. RUN LENGTH

Data: 100K Department streams layer from Eric Haney (Region 1)

Analysis: For this analysis the downstream stream length from the output point of each HSA to the mouth (ocean or SF Bay) was used. Then a ‘pseudo radius’ value for each HSA based on its area was added. This addition created a run length that pushed partially into the HSA and it also provided run lengths for coastal HSAs that otherwise would have received a zero value. The results were then grouped into rankings based on five categories (different ranges for the two ESUs).

High rankings were given to both very short and very long runs, with the assumption that these represented potential unique populations of coho salmon.

RANKING	SONCC	CCC
5	0-13 miles	0-4 miles
3	14-40	5-6
1	41-82	7-8
3	83-126	9-11
5	127-200	12-31

Limitations: Because good point location data for the coho salmon are not available, exact run-lengths to spawning areas could not be calculated; instead, an average value (that goes mid-way into the HSA where there are coho salmon) was calculated.

4. CENSUS POPULATION DENSITY

Data: Year 2000 census data from Department library (by Census Tract)

Analysis: For this analysis the existing Density Class field (1-10) was used and aggregated up from Census Tract to HSA. For each Census Tract (or part of a Census Tract as clipped by the HSA boundary), the Density Class was multiplied by the percentage area of the Tract to the HSA, and then all the pieces were added. The results were then grouped into five rankings for each ESU.

Limitations: A risk to the coho salmon population is inferred based on the density of people. While the census data are fairly accurate, the relationship of human density to coho salmon risk is not necessarily a direct linear one.

5. POINTS OF WATER DIVERSION

Data: State Water Resources Control Board's Water Rights Information System (data from 12/2002).

Analysis: Within the historical range of coho salmon, the points of diversion were summarized by HSA. The totals were then grouped into ranks based on percentiles:

PERCENTILE	RANGE	RANK
50%	0-19	1
60%	20-41	2
70%	42-64	3
80%	65-186	4
95%	187-1045	5

Limitations: The data used for this analysis were the best available and capture most of the legal water diversions from streams. However, what they do not capture (at this time) is the amount of water pulled out at each diversion. Some diversions may be for a single residence, while another may be for a very large water district transfer or large irrigation project. Ideally, the amount of water diverted rather than the number of diversions would be used.

6. ROAD DENSITY

Data: 100K roads data from the Department library (USGS DLG data by county)

Analysis: Miles of roads per HSA were counted and then divided by total square miles per HSA to get a miles/sq mile figure. The results were then grouped into five rankings for each ESU.

Limitations: The 100K roads data used for this analysis are the best available for the whole coho salmon range at this time. However, at the 100K-scale of data capture, large numbers of smaller rural roads are left out, thus somewhat diminishing the road density in the rural areas. Ideally, 24K roads data would be used.

Risk of extinction for the SONCC Coho ESU is shown on Figure 6-25 and for the CCC Coho ESU on Figure 6-26.

MAP 3: PRIORITIZED WATERSHEDS FOR MANAGEMENT ACTIONS

What: Shows the combination of coho salmon population factors, risk factors and watershed status by HSA.

Data: This map represents the compilation of several data sources. It starts with Map 2: Coho salmon population and risk (see above) and adds a combined watershed status analysis that was compiled based on the professional opinion of Department field staff on three categories for each HSA: potential habitat, disconnected habitat, and watershed condition.

Analysis: Department field staff were asked to rank each HSA (1-5) in their region based on the following three categories: 1) potential habitat, stream gradient and pools; 2) disconnected habitat, barriers; and 3) watershed condition, overall condition, impairments, disturbances. These ranks were then added together and added to the totals from Map 2: Coho salmon population and risk. The totals were then grouped into ranks (1-5) separately for each ESU.

Limitations: The limitations for this map include the limitations from Map 2: Coho salmon population and risk. In addition, the three ranks collected from Department field staff are subjective.

MAP 4: DISCONNECTED HABITAT

What: Shows the amount and type of stream barriers to coho salmon migration.

Data: These data are based on the professional opinion of Department field staff.

Analysis: Department field staff were asked to rank each HSA (1-5) in their region based on disconnected habitat. The possible categories are as follows:

- N/A = not current or known historic coho salmon habitat
- 0 = natural, permanent, or year-round barrier to coho salmon migration
- 1 = an extremely large barrier (e.g., major dam like Iron Gate) or an extremely large number of confirmed barriers
- 2 = large numbers of confirmed barriers
- 3 = a moderate number of barriers need to be removed or modified to allow all life stages passage to restorable coho salmon habitat
- 4 = a few barriers need to be removed or modified to allow all life stages passage to existing coho salmon habitat
- 5 = none to very few barriers need to be removed or modified to allow all life stages passage to existing coho salmon habitat

Limitations: The data for this map are based on professional opinions from Department field staff and are subjective.

Restoration and management potential for the SONCC Coho ESU is shown on Figure 6-27 and for the CCC Coho ESU on Figure 6-28. Disconnected habitat for the SONCC Coho ESU is shown on Figure 6-29 and for the CCC Coho ESU on Figure 6-30.

